custom in Domesday Book *when any place is an island, to call it so.* For example, in vol. i., folio 75, "Dorsete" [Dorset], we have—"The land of the King. The King holds the island which is called Porland [*i.e.* Portland]. King Edward held it in his life." And again, same vol., fol. 396—"Hanteschire [*i.e.* Hampshire]. These lands below written lie in the isle of Wit" [*i.e.* Wight].

In short, the Mount could not have been an island in 1086, because it then contained at least eight times as much land as it does at present, probably connecting it with the mainland, from which it is even now only one-third mile distant. The truth, Sir Henry Ellis says, seems to be that a hide, a yardland, a knight's fee, &c., contained no certain number of acres, but varied in different places at different times. He says there are "four virgates in each hide, and thirty acres to make a virgate." The elementary acre was 40 perches by 4 perches, as now. And, accordingly, the 8 carucates would amount to the respective numbers of acres mentioned in the last column of the following table at the respective times:—

| Periods | Acres in a Carucate | No. of Carucates | Total Acres |
|---|---|---|---|
| Carucate temp. Richard I. | 60 | 8 | 480 |
| do. do. | 100 | 8 | 800 |
| do. Edward I. | 180 | 8 | 1440 |
| do. 32 Edward III. (Oxon) | 112 | 8 | 896 |
| do. Middleton | 150 | 8 | 1200 |

The hide is generally supposed to have been 120 acres. Now, taking the smallest of these measures, we shall have for the two hides 240 acres. The present area of the Mount, however, is only 30 acres, so that there are 210 acres missing. How can we account for them except by supposing that the Mount extended further, perhaps in every direction? The hide of land taken by Earl Moriton was given to Mont S. Michel,[*] on the French coast where Normandy joins Britanny, in 1085.

I have before me "Two of the Saxon Chronicles parallel," edited and commented on by the Rev. John Earle, formerly Professor of Anglo-Saxon, Oxford, from which the two following remarkable passages are extracted for the respective years 1014 and 1099.

"1,014. And on this year, on Saint Michael's-Mass-Even, came that great sea-flood through widely this land, and ran so far up as never before not did, and submerged many towns, and mankind innumerable number," p. 151.

"1,099. This year also, on St. Martin-Mass-Day, sprang up that exceeding sea-flood, and so much to harm did, as no man not remembered that it ever afore did, and was that same day a new moon," p. 235.

Nobody seems to contend that the coasts of Cornwall have simply been abraded and cut back by the action of the sea during the Christian period. Nor does anyone appear to doubt that there has been a *subsidence.* Now there are 210 acres of land missing since 1086, and in 1099, thirteen years *after*, we have a record of a catastrophe which would fully account for the loss! Supposing, whilst travelling in a foreign country, we were to come suddenly upon a city in ruins, when we had personally experienced shocks of earthquake a short time before. How could we doubt that the earthquake was the cause of the ruins, and how can we doubt that the remarkable event of 1099 caused the loss of land by subsidence and the Insulation of the Mount?

Sir Henry de la Beche (Report on Cornwall, &c., p. 417, *et seq.*) says "submarine forests are so common that it is difficult not to find traces of them in the district at the mouths of all the numerous valleys which open upon the sea, and are in any manner silted up." . . . . It is well known that abundance of roots and stumps of trees have been found *in situ* for some distance on the south of the Mount. And no one seems to doubt that "the Mount was formerly five or six miles from the sea, and enclosed with a very thick wood," and that it was called in the Cornish language "the hoar rock in the wood."

I have before me the very interesting Prize Essay by Mr. John E. Thomas, F.G.S., written for the National Eisteddfod, held at Chester, 1866, upon the "Encroachment of the Sea between the River Mersey and the Bristol Channel."[†] Prof. Ramsay, who had the adjudication of the prize, says, "The result is so good, that I think this part of the Essay well worthy of the prize of 10*l.* and a medal." Mr. Thomas does not look further back than the year 520 for his sinkings in Cardigan Bay (p. 13). A perusal of the whole tract of twenty-four pages will well repay gentlemen who take an interest in this particular department of geology.

Jersey, Jan. 23 R. A. PEACOCK

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[*] Penny Cyclop. Art. CORNWALL.

[†] Published by Messrs. Spon, Charing Cross, price 1*s.*

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### Measurement of Mass

PROF. EVERETT'S first letter contains the statement "Deschanel, in accordance with what has been till recent years an almost universal custom, employs a variable unit of force, and as depending upon this, a variable unit of mass, so that the number denoting the mass of one and the same body is diminished as the body is carried from the equator to the poles, and would increase up to infinity if the body fell to the centre of the earth."

I wished to point out that in making the standard pound a unit of force, by defining the place where it is to be used, we do not adopt a unit of mass which is variable, since if we take three times as much matter as gravitates with the unit force, we shall obtain the same mass at whatever point of the earth's surface the comparison is made. I cannot see that the adoption of this method necessitates any filing or loading of weights to suit change of latitude, since we invariably employ an ordinary balance and not a spring balance to effect our weighings.

Whenever it does become necessary to compare gravitating forces, we are obliged to fall back upon the use of the pendulum, whether we adopt the old system of standards or the new.

As a philosophical theory I am perfectly ready to admit that the standard pound is most appropriately considered as a standard of mass, but the employment of this standard in a text-book for the use of beginners seems calculated to lead to confusion.

If we refuse to commit ourselves to the absurdity of comparing the quantity of one kind of matter with the quantity of another kind of matter, I hardly see how *mass* is to be defined except by means of weight, and without, for the moment at least, employing weights as measures of force.

The assumption of a hypothetical force of gravity not dependent on latitude seems to stand on the same footing as the employment of a *mean solar day*; it is convenient, leads to no confusion, and is not unphilosophical. W. M. W.

### Mount Etna

IT may interest the observers who have lately been in Sicily to hear that since their departure there has been a sad falling off in the appearance of Etna. The grand wreath of steam that used to roll out of the crater at such stately leisure that you could hardly detect any movement without close attention, suddenly ceased about three days ago, and left nothing more than a tiny wisp of smoke, rather suggestive of a cottage chimney than a volcano. I call it smoke because the colour became decidedly darker than it used to be, and the manner of its dissipation is different. Formerly, after issuing from the crater it used to assume true cloud forms, and lie about the mountain exactly like clouds: now, it diffuses itself as a thin veil over the sky; sometimes being traceable in a streak as far as the coast of Calabria. Its volume is perhaps a thousandth part of what it was last week. It issues in a distinctly spiral form, the wreath oscillating apparently from side to side of the crater; and sometimes there are little puffs of extra size, whilst at others the wreath is nearly sundered.

The date of the change cannot be very precisely given, although I have watched the mountain at all hours of the day for a week past, in hopes of getting a correct outline of it for pictorial purposes. The clouds only cleared off completely yesterday; but I observed that a change in the wreath had taken place as early as Friday the 13th January. The weather up to the 15th has been outrageously squally and rainy, but is now superb. Last night there was a magnificent display of zodiacal light, considerably brighter than we saw it at Augusta before the Eclipse, and distinctly traceable up to the zenith; the apex of the cone reaching to within about 10° of the Pleiades. It was brightest about 7 P.M., but was still visible at 10 P.M., when clouds shut it out.

Taormina, Sicily, Jan. 17 JOHN BRETT

### Note on Chromosphere Lines

A VERY small but very bright prominence on the N.W. limb of the sun, observed at Xeres Dec. 21st, gave in addition to the ordinary protuberance bright lines the following—one below C

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at 656 Kirchhoff's scale precisely corresponding to an iron line in the solar spectrum—also 3 at 1601, 1605, and 1607, the reversal of a well-known group of *Chromium* lines. The latter I believe are new in prominence spectra.

C. A. YOUNG

## Eozoön Canadense

I HAVE just observed that in your number for December 22 a correspondent revives some of the old but often refuted objections to the organic nature of Eozoön. As the mail closes in a few hours, and I have lectures in those hours, I cannot reply by this opportunity; but shall crave a small share of your space next week to show that the objections stated are unfounded; and to state what is now being done here in further illustration of this ancient and veritable fossil.

J. W. DAWSON

M'Gill College, Montreal, Jan. 16

THE battle for the *Eozoön Canadense* may be left to Messrs. Carpenter, Jones, King, Rowney, and other eminent microscopists, but perhaps an outsider may be pardoned if he asks some anomalies to be explained.

In the Ophytes of Bennabeola the mountain group in Connemara, or rather Yar-Connaught, Mr. Sandford proved the existence of the *Eozoön Canadense*, and his opinion was backed up by Mr. R. Jones and also, if I remember rightly, by Dr. Carpenter. There are acres upon acres of limestone in that country of the same age, and some of them on the same geological horizon as the Ophytes, Ophicalcytes, Ophimagnesytes and Ophidolomytes; yet, in no plaec, except where Ophyte or one of its varieties exist, has the Eozoönal structure been found. Furthermore, when the West Galway Ophytes are followed in depth they graduate into a Schistose-dolomyte that may be micaceous, felsitic, or quartzitic, and contains more or less calcyte; yet in these dolomytes there is no trace of the Eozoonal structure.

These rocks of Yar-Connaught are said to be of Lower Silurian (Cambro-Silurian) age, by Sir R. I. Murchison, Prof. Harkness, and other eminent geologists. In other parts of the world will be found square miles upon square miles of rocks, of the same geological age, often having inliers of limestones, yet in them there is no *Eozoön Canadense*, it only being found in a peculiar rock (pseudomorph dolomyte) in this small tract of Lower Silurian rocks, in Yar-Connaught.

Yar-Connaught, Jan. 23

G. H. KINAHAN

IF my previous letter, as alleged by Dr. Carpenter, exhibits a complete misapprehension of the state of our knowledge of the above fossil, I cannot plead in extenuation a want of familiarity with the arguments he again brings forward in support of the organic theory. Had he, instead of explaining away imaginary difficulties, addressed himself to those that really exist, his reply would have possessed greater value. Let us examine how my objections have been met.

Firstly, then, Dr. Carpenter cannot affirm that any specimen of Eozoön has been obtained from unaltered rocks. He can go no further than to say that his best specimens are from rocks that have undergone the *least* metamorphic change. Thus it appears after all, that it is only a question of *degree* in metamorphism; and when we consider that Logan, Dawson, Sterry Hunt, and himself, in their original papers, constantly alluded to these Eozoönal rocks as crystalline, highly crystalline, of serpentine marble, &c., we are enabled to judge of the value of the diminutives "little" and "least," now used when it becomes necessary to the argument to soften down these expressions. Sir W. Logan, who is an authority on the subject, says:*—"Any organic remains which may have been entombed in these limestones would, if they retained their calcareous character, be almost certainly obliterated by crystallisation, and it would only be by the replacement of the original carbonate of lime by a different mineral substance, or by an infiltration of such a substance into all the pores and spaces in and about the fossil, that its form would be preserved." It would be strange indeed if, during the millions of years since the deposition of the Laurentian limestones, they had undergone no change, and notwithstanding Sterry Hunt's depositional views, the consensus of opinion is in favour of serpentine itself being a product of alteration.

Had Dr. Carpenter pointed out where serpentine pyroxene or loganite had been found in unaltered rocks, instead of dwelling upon the internal casts of foraminifera distinguishing the Greensand formation, his remarks would have been more relevant to the subject. These casts, it is well known, are in glauconite, a hydrous silicate of protoxide of iron and potash. Whether or not the silicates replacing the sarcode bodies of the foraminifera dredged up by Capt. Spratt in the Ægean, are the result of precipitation from sea water, caused by the decomposition of the sarcodic substance, is quite immaterial to the argument; but if, as is assumed, the chambers of Eozoön were filled in the same manner with serpentine, and this chemical reaction was necessary to its precipitation, how are we to account for the serpentine investing huge blocks of pyroxene, and the solid bands of the same mineral intercalated in the limestone? If, therefore, I admit the possible infiltration of certain silicates into the *body* of Eozoön—did such an animal ever exist—it is no help to those who favour the organic hypothesis. I have, however, neither affirmed nor denied such a possibility, as it is entirely outside of my line of argument.

As regards *hydrothermal* action, which it appears is objected to if called in to aid my theories, I may say it is a matter of indifference what the *agency* be so long as the *alteration* is proved.

It would take up too much of your space for me to go into the details of the "canal system," "nummuline layer," "chamber casts," "Stolon passages," "pseudopodial tubules;" and such is unnecessary, as Profs. King and Rowney have pretty well exhausted the subject, and, to my mind, have conclusively proved the existence of identical forms of purely mineral origin. If, as is alleged, the canal system always crosses the cleavage planes, and is never between them, such would appear to be correlative mineral phenomena, and tells against the organic hypothesis. I object, however, to a question of such wide bearing being settled solely on the authority of Dr. Carpenter as a microscopist. If others are wrong, let him demonstrate the fact, which his great experience will more readily enable him to accomplish.

If I have misconstrued the following passage into an admission which he now repudiates, I am ready to make ample apology; perhaps, however, he will explain to what the term "elsewhere" refers. After combating the notion that the *nummuline* layer can be precisely parallel in a purely mineral production, he says he is "prepared to maintain the organic origin of Eozoön on the broad basis of cumulative evidence afforded by the combination in every single mass of an assemblage of features which can only be *separately* paralleled elsewhere."*

Such is Dr. Carpenter's unbounded faith in Eozoön—though every hypothesis attempting to bring it into the category of organic beings is beset with difficulties—that he would not be surprised to find it existing now in the deep-sea bottom. There is, he says, no *a priori* improbability in such an event happening, and indeed there is not, for the persistence of types is one of the most remarkable of zoological facts. But as the area in which Eozoön is to be found is enlarged, and the duration of its time lengthened, our difficulties increase. If the infilling material of the chamber casts is due to substitution during decomposition, or to direct deposition as suggested by Sterry Hunt, there is no possible reason why we should not find Eozoön in some of the immense masses of unaltered limestone which still exist. I repeat that it has never yet been found in such rocks, but always in those that have been metamorphosed. If again serpentine is not a product of alteration, why do we not find it in unaltered rocks? The inference is obvious, they are correlative phenomena, and therefore Dr. Carpenter must pardon me if I decline at present to adopt his views. Still I am open to conviction, and will freely admit my error when, after some of his deep-sea dredgings, he brings home the modern Eozoön fossilised with a silicate, and when, in addition, it is discovered in an unaltered limestone fossilised with serpentine pyroxene or loganite.

T. MELLARD READE

Blundellsands, Liverpool, Jan. 9

## The Eclipse Expedition

HOW about the Eclipse Expedition, which, I presume, you helped to sanction? I informed the public that it would prove a complete swindle, and so it has turned out. As long as such professional liars as the Astronomical Society are allowed to gull the nation, what chance is there of arriving at the truth?

JOHN HAMPDEN

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* "Geological Journal," No. 81, p. 48.

* Geological Journal, vol. xxii., p. 22 n

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